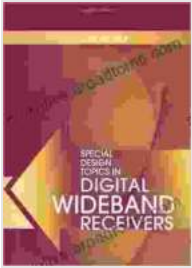


# Special Design Topics In Digital Wideband Receivers: A Guide to Unlocking Receiver Performance



## Special Design Topics in Digital Wideband Receivers (Artech House Radar Series) by A.N. Williams

★★★★★ 5 out of 5

Language : English

File size : 14174 KB

Text-to-Speech : Enabled

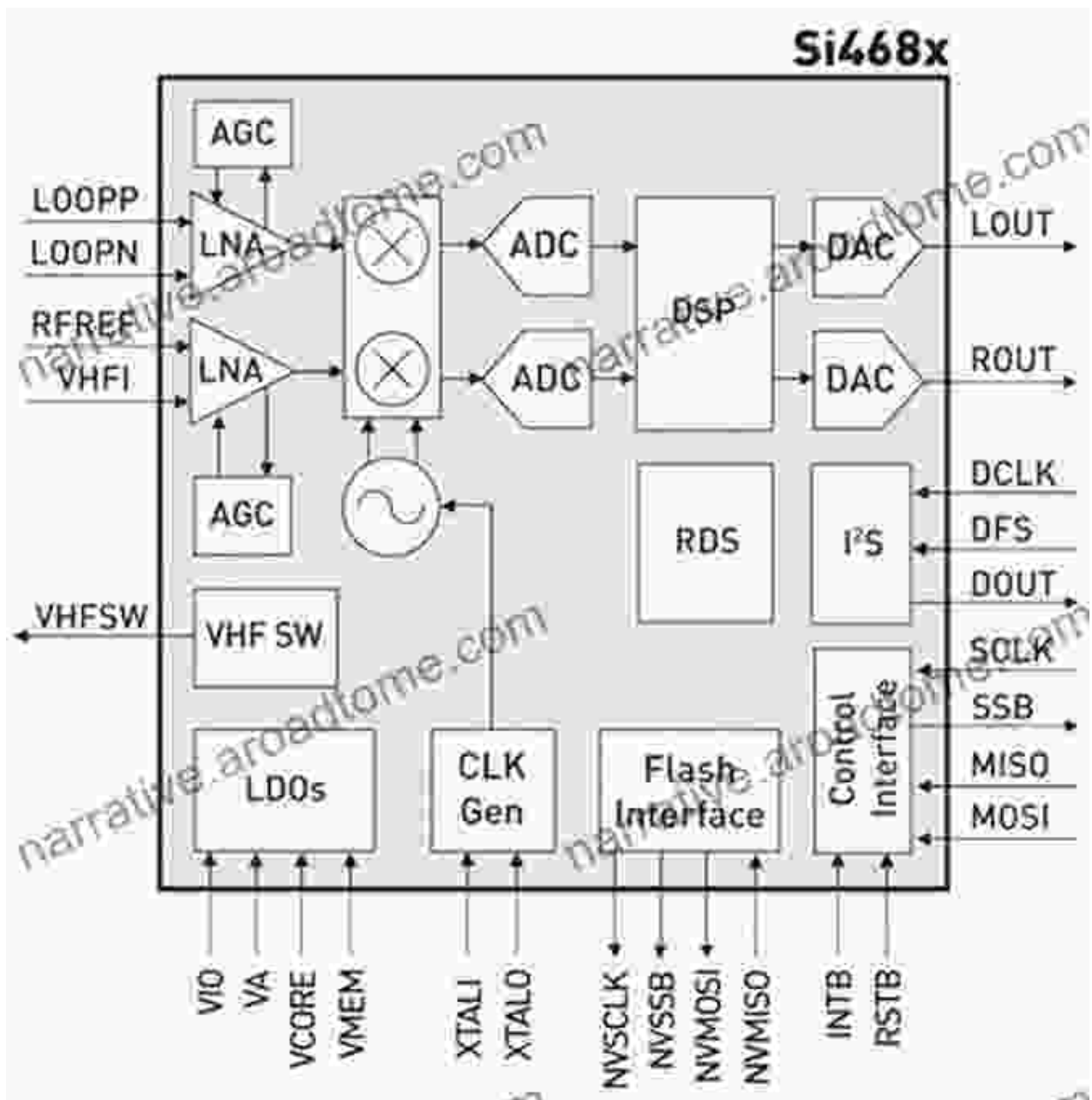
Print length : 420 pages

Screen Reader : Supported



## Delving into the Realm of Digital Wideband Receivers

In the ever-evolving landscape of communication and radar systems, digital wideband receivers play a pivotal role in capturing and processing high-speed signals. These sophisticated receivers are essential for applications demanding high performance, wide bandwidths, and exceptional signal acquisition capabilities.



This comprehensive guide delves deep into the intricacies of digital wideband receiver design, providing a comprehensive overview of the key concepts and techniques involved. From analog front-end design to digital signal processing algorithms, we will explore the building blocks of these high-speed receivers, enabling you to grasp the challenges and opportunities they present.

## **Chapter 1: Fundamentals of Digital Wideband Receivers**

In this foundational chapter, we will establish the theoretical basis for digital wideband receivers. We will cover topics such as:

- Sampling theory and quantization effects
- Signal representation in the digital domain
- Digital modulation techniques
- Nyquist rate, oversampling, and undersampling

## **Chapter 2: Analog Front-End Design**

The analog front-end is crucial for signal conditioning and initial processing in a digital wideband receiver. This chapter will focus on:

- Low-noise amplifier design
- Mixer and down-conversion techniques
- Analog-to-digital conversion principles
- Anti-aliasing filters and data acquisition

## **Chapter 3: Digital Signal Processing Algorithms**

Digital signal processing algorithms play a central role in extracting and enhancing the information contained in the received signal. This chapter will cover:

- Digital filtering and equalization
- Decimation and interpolation techniques

- Fast Fourier Transform (FFT) algorithms
- Adaptive filtering and interference cancellation

## **Chapter 4: Advanced Receiver Architectures**

Moving beyond the conventional receiver architectures, this chapter will delve into:

- Parallel and pipelined receiver architectures
- Direct-conversion receivers
- Ultra-wideband receiver architectures
- Cognitive radio receiver design

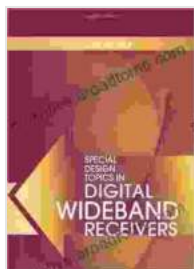
## **Chapter 5: Performance Analysis and Optimization**

Receiver performance is paramount for successful signal acquisition and processing. This chapter will cover:

- Signal-to-noise ratio and dynamic range
- Sensitivity and selectivity
- Spurious signals and interference mitigation
- receiver testing and characterization

This comprehensive guide to special design topics in digital wideband receivers provides a solid foundation for understanding and designing high-performance receivers. With detailed explanations, real-world examples, and up-to-date research, this book is an invaluable resource for engineers,

researchers, and students working in the field of communication and radar systems.



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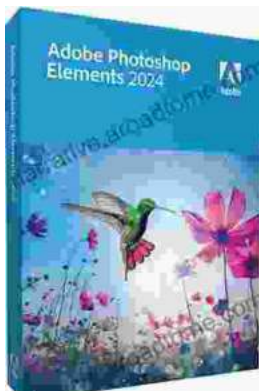
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